618-CD-002-001

EOSDIS Core System Project

Release B Replacement Parts List and Spare Parts List for the ECS Project

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May 1996

Hughes Information Technology Systems
Upper Marlboro, Maryland

Release B Replacement Parts List and Spare Parts List for the ECS Project

May 1996

Prepared Under Contract NAS5-60000
CDRL Item 124

SUBMITTED BY

Mark Settle /s/ 5/14/96

Mark Settle, Project Manager Date
EOSDIS Core System Project

Hughes Information Technology Systems
Upper Marlboro, Maryland

618-CD-002-001

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Preface

This document is a formal contract deliverable with an approval code of 3. This document is delivered to NASA for information only, but is subject to approval as meeting contractual requirements.

Once approved, this document shall be under the control of the ECS System Integration and Planning Office. Any questions or proposed changes should be addressed to:

Data Management Office
The ECS Project Office
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Abstract

This Replacement Parts List and Spare Parts List (CDRL 124, DID 618) identifies Release B sparing methodology and representative hardware line replaceable units (LRUs) considered for sparing by the ECS Contractor at individual sites and/or at a central location. This document identifies replaceable units by name, part number, quantity, cost, and repair code.

Keywords: Line replaceable unit (LRU), administrative/logistics delay time (ALDT), spare part, repair part, spares, provisioning, mean time between failure (MTBF), original equipment manufacturer (OEM), replacement parts List (RPL), and spare parts list (SPL).

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B-1 and B-2	Submitted as Final
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Abbreviations and Acronyms

1. Introduction

This document, Contract Data Requirements List (CDRL) Item 124, whose requirements are specified in Data Item Description (DID) 618/OP3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

1.1 Purpose and Scope

This document provides preliminary sparing information for Release B hardware at ECS DAAC sites and the ECS Development Facility (EDF) in Upper Marlboro, Maryland. A final and updated Spare Parts List will be delivered at RRR.

1.1.1 Purpose

The purpose of this document is to provide a preliminary spares candidate list and methodology description that identifies the line replaceable units (LRUs) and their quantities that may be provisioned as centrally stored spares or site spares at one or more Release B DAACs.

1.1.2 Scope

The Release B sparing methodology is provided, and its feasibility demonstrated, through a representative preliminary spares candidate list. This list contains spares to be considered by the ECS Contractor and is limited in scope to critical equipment within critical functional strings of FOS. Although Release B CDR identified equipment types, quantities, and locations in the design, elements of this design may be altered before it receives Government approval. Thus, a reduced scope preliminary spares candidate list is used to demonstrate the methodology to be used for Release B sparing decisions. This methodology will be applied to all Release B finalized and approved design equipment in development of the final spares candidate list for RRR.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction #11, dated December 6, 1994.

1.2 Program Summary

Provisioning of spare parts at specific locations is a function of determining and applying the sparing factors in concert with the Release B maintenance approach for each equipment item being considered. Sparing factors are discussed later in this document. The maintenance approach for Release B is for the original equipment manufacture (OEM) or a third party maintenance provider to perform the on-call site support. In such cases the OEM or third party maintenance provider will provide the replacement parts with exceptions to this sparing approach noted later in this document. This combination is expected to provide the most cost effective approach in meeting the operational availability (A_O) and mean down time (MDT) requirements

specified in the Functional and Performance Requirements specifications, document number 423-41-02.

1.3 Updating Process

Changes to this plan will be recorded in the change page at the front of this plan. This plan may be reissued whenever the number of changed pages make it more efficient and economical to do so. The distribution of reissued spares lists and changes will be in the same quantities and to the same organizations that received the initial spares list, unless the distribution list is revised by request.

1.4 Document Organization

The contents of the document are as follows:

Section 1: Introduction - Introduces the purpose, scope, program summary, up-dating process, and document organization.

Section 2: Related Documentation - Describes the parent, reference, and applicable documents useful in understanding the details of subjects discussed in this document.

Section 3: System to be Supported - Briefly describes Release B equipment and locations.

Section 4: Spares Program Management - Describes the relationship of the ILS spares function to other Project activities.

Section 5: Methodology - Describes the process and factors associated with determining what LRUs are to be spared at individual locations and/or at a central point.

Section 6: Appendix A is a representative list of Release B spares from a single manufacturer.

Appendix B is a projection of expected OEMs'/third party maintenance providers' response times.

Section 7: Abbreviations and Acronyms

2. Related Documentation

2.1 Parent Documents

The following documents are the parents from which the scope and content of this document derive:

420-05-03	Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)
423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the EOSDIS Core System (ECS)

2.2 Applicable Documents

The following documents are referenced within this Replacement and Spare Parts List, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document:

500-TIP-2110	Goddard Space Flight Center, Mission Operations and Data Systems Directorate (MO&DSD) Technical Information Program Specifications for Document Formats
none	Goddard Space Flight Center, EOSDIS Core System (ECS) Integrated Logistics Support Plan
NHB 6000.1D	NASA Handbook: Requirements for Packaging, Handling and Transportation
MIL STD 1388-1A	Military Standard: Logistics Support Analysis

2.3 Information Documents

The following documents amplify or clarify the information presented in this document. These documents are not binding on the content of this Parts List.

104-CD-001-004	Data Management Plan for the ECS Project, Revision 1, DCN No. 01
193-105-MG3-001	Data Management Procedures for the ECS Project
302-CD-002-001	Release A and FOS Release A and Release B Facilities Plan for the ECS Project

501-CD-001-004	Performance Assurance Implementation Plan (PAIP) for the ECS Project
515-CD-002-002	Release B Availability Models/Predictions for the ECS Project
516-CD-002-002	Release B Reliability Predictions for the ECS Project
518-CD-002-002	Maintainability Predictions for the ECS Project
601-CD-001-004	Maintenance and Operations Management Plan for the ECS Project
194-602-OP1-001	Property Management Plan for the ECS Project
604-CD-001-004	Operations Concept for the ECS Project: Part 1-- ECS Overview
604-CD-002-003	Operations Concept for the ECS project: Part 2B -- ECS Release B
604-CD-003-001	Operations Concept for the ECS Project Part 2A -- ECS Release B
613-CD-003-001	Release B COTS Maintenance Plan for the ECS Project
615-CD-002-001	Release B Special Maintenance and Test Equipment for the ECS Project
616-CD-002-001	Release B Integrated Support Plan for the ECS Project
617-CD-002-001	Release B Logistics Support Analysis Plan for the ECS Project
619-CD-002-001	Release B Test and Support Requirements for the ECS Project
800-WP-002-001	Facilities Plan for Release B for the ECS Project, White Paper
S-530-1	Goddard Space Flight Center, Specification for Ground System Spare Parts Program
STDN 507	Goddard Space Flight Center, Spaceflight Tracking and Data Network Network Logistics Manual
NHB 4200.1C	NASA Handbook: Equipment Management Manual
NHB 6000.1D	NASA Handbook: Requirements for Packaging, Handling, and Transportation
MIL-HDBK-217F	Military Handbook: Reliability Prediction of Electronic Equipment
NPRD-91	Reliability Analysis Center, Rome Laboratory, Griffiss AFB; Non-Electronic Parts Reliability Data

3. System To Be Supported

3.1 System Description

Release B is the second major ECS equipment release and incorporates all previous releases for the ECS, a geographically distributed ground system network of hardware (HW) and software (SW). Release B equipment consists entirely of COTS HW, such as workstations, servers, processors, stackers, robotics, storage subsystems, concentrators, routers, bridges, and various peripherals.

3.2 ECS Locations

Release B equipment will be installed and supported by the ECS Contractor at six DAAC sites — the three Release A operational DAACs and three new Release B DAACs — plus the EOC and SMC at GSFC and the EDF. A mirror image of DAAC HW and SW will be installed at the EDF. The Release A locations are listed in subparagraph "a" and the additional locations for Release B are listed in subparagraph "b" below:

a. Release A locations:

   1. Goddard Space Flight Center (GSFC), Greenbelt, Maryland
   2. Earth Resources Observation Systems (EROS) Data Center (EDC), Sioux Falls, South Dakota
   3. Langley Research Center (LaRC), Hampton, Virginia
   4. ECS Development Facility, Upper Marlboro, Maryland

b. Release B:

   1. Alaska SAR Facility (ASF), Fairbanks, Alaska
   2. Jet Propulsion Laboratory (JPL), Pasadena, California
   3. National Snow and Ice Data Center (NSIDC), Boulder, Colorado
   4. Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee
   5. Goddard Space Flight Center (GSFC) EOC and SMC, Greenbelt, Maryland

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4. Spares Program Management

4.1 Objectives, Policies and Procedures

The spares program is designed to ensure cost effective spares support sufficient to achieve the operational availability (A_O) and mean down time (MDT) requirement goals of the ECS Project in implementing the maintenance approach for Release B. This is accomplished by considering the hardware design redundancy and analyzing the operational and logistics characteristics of high failure critical LRUs. These characteristics are the LRU's criticality to the ECS Project, administrative logistic delay time (ALDT), remove and replace time, and cost to purchase or rent the LRU.

The ECS maintenance approach with Release B hardware has been modeled and demonstrates that the ECS project meets the RMA functional and performance requirements in the Functional and Performance Requirements Specifications (F&PRS) document, 423-41-02. The driver for ECS sparing is the functional string's MDT requirements. Sensitivity analysis using the RMA availability model demonstrated that ALDT has the greatest impact on ECS MDT, both at individual sites and the total ECS system. The driver of ALDT is spares availability, which is addressed in Section 5, Sparing Methodology, of this document.

The adequacy of sparing decisions will be monitored by tracking the A_O and MDT to ensure the operational availability of ECS functions meet the minimum requirements in the F&PRS. If the operational availability of a function or an MDT requirement falls below the specified minimum requirements, site and equipment sparing will be reviewed to determine if changes need to be made in the sparing levels, location, or maintenance provider's responsiveness.

4.2 Organization

The ILS Manager is responsible for planning and managing spares functions and provides the logistics interface with the ECS development managers of the FOS, SCDO and SMO segments. This interface includes sparing issues as well as other logistics issues related to FOS, SDPS, and CSMS. The ILS Manager manages the spares function through a logistics staff in the ILS Planning Activity.

The spares function is provided to support DAAC operations throughout the Release B timeframe at all DAACs with the exception of ORNL. Spares support at ORNL will be provided by the hardware OEM warranty support procedures for the duration of the warranty period and thereafter through ORNL's local capabilities.

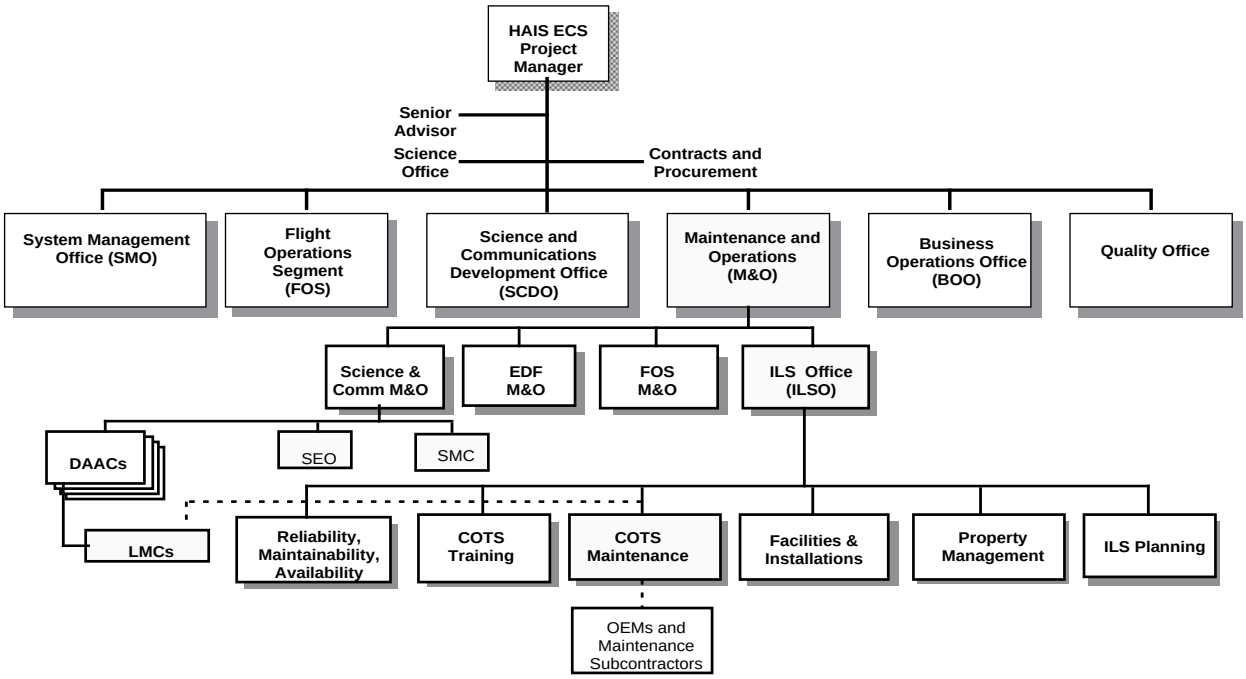

Figure 4-1. Logistics Organization

For Release B, the ILSO will continue to operate out of GSFC, Building 32, and the ECS development Facility (EDF) in Upper Marlboro, Maryland.

5. Sparing Methodology

5.1 Support Concept

The focus of the spares program is to plan, provide, and manage the Release B spares resources required to support ECS operations in concert with the maintenance approach and hardware architecture for Release B. The maintenance approach for Release B is for OEM/third party maintenance providers to be the principal provider of maintenance spares at each DAAC, with certain specified exceptions discussed later. Logistics personnel at ECS sites will follow the support concepts, policies, and procedures applicable to that ECS site.

The goal of the spares program is to ensure adequate spares are provided and sustained to achieve the ECS required operational capabilities and performance at the least LCC. Release B operational requirements are contained in Table 5-1, ECS Release B Operational Requirements.

5.2 Provisioning and Supply Support

At the time of submission of this plan, the quantity, make, and model of Release A COTS equipment has been finalized and approved by the Government. The additional hardware constituting the Release B design has been presented at the CDR but not yet approved by the Government. The range and depth of sparing decisions is dependent upon the finalized scope of equipment in the Government approved Release B detailed design. Therefore the full extent of spares that may be required can not be determined until analysis of sparing factors is accomplished on the Government approved Release B design. The candidate LRUs identified in this preliminary sparing document will be incorporated into the updated and final sparing recommendations submitted to the ILS Management Team for approval consideration at a provisioning conference held prior to the Release B RRR.

Spares provisioning modeling will be guided by provisions contained in GSFC S-530-1, Specification for Ground System Spare Parts Program. Stocks of LRUs will be at the cost efficient level required to sustain the ECS A_o and MDT requirements goals.

5.2.1 LRUs

Spare LRUs will be prepositioned at or near ECS sites to provide quick replacement of failed LRUs. Such spare LRUs will be provided by the OEM/third party maintenance provider with exceptions noted later in this document.

Table 5-1. ECS Release B Operational

Function Number	Function Description	A_O Minimum	MDT Maximum
	Flight Operations Segment (FOS)		
3800	Critical Real Time Functions	0.9998	1 Min.
3810	Non Critical Real Time Functions	0.99925	5 Min.
3820	Targets of Opportunity	0.992	1 Hr
3700	Observatory Real Time Operations Functions	0.96	4 Hrs
3710	ECS shall have no single point of failure for functions associated with real time operations of the spacecraft and instruments		
	Science Data Processing Segment (SDPS)		
3900	Data Receiving	0.999	2 Hrs
3910	Switch over to Backup	NA	15 Min.
3920	Archiving & Distributing Data	0.98	2 Hrs
3930	User Interface to IMS at DAACs	0.993	2 Hrs
3940	Information Searches on the ECS Directory	0.993	2 Hrs
3950	Data Acquisition Request Submittals	0.993	2 Hrs
3960	Metadata Ingest and Update	0.96	4 Hrs
3970	Info Searches on Local Holdings	0.96	4 Hrs
3980	Local Data Order Submission	0.96	4 Hrs
3990	Data Order Submission Across DAACs	0.96	4 Hrs
4000	IMS Data Base Management and Maintenance Interface	0.96	4 Hrs
4010	Product Generation Computers	0.95	NA
4020	Product generation computers shall provide a "Failsoft" environment		
	Communications and System Monitoring Segment (CSMS)		
5.6.4.3	Critical Services: Configuration Management, Resource Management, Performance Management Service, Report Generation, Accounting/Accountability, Fault Management, Security Management, and Directory Services	0.998	20 Min.
5.6.4.3	Non Critical Services: Scheduling services and non-critical CM services	0.96	4 Hours
4030	SMC functions of Gathering and Disseminating System Management Information	0.96	4 Hours
4035	ESN shall have no single point of failure for functions associated with network databases and configuration data		
4036	ESN A_o shall be consistent with the A_O of the ECS functions.		
3630	Maximum down time shall not exceed twice the required MDT in 99 percent of failure occurrences		

Ao = Operational Availability

MDT = Mean Down Time

5.2.2 Sparing Factors

Sparing factors will be applied to determine LRUs to spare, their quantity, and location. Sparing factors consist of the following OEM and ECS Project information:

a. ECS Release B hardware design redundancy

b. OEM/third party logistics support/sparing capability and responsiveness

c. ECS A_O and MDT requirements

d. OEM's predicted MTBF rates

e. Cost to own or rent LRUs

f. Proximity of OEMs'/Third party maintenance providers' spares stockage to the DAAC

g. Equipment quantities

h. DAAC location

5.3 General Sparing Methodology

ECS Release B has significant hardware redundancy designed-in to absorb malfunctions and continue operations. This robust design and contracted four hour on-site OEM/third party maintenance response allows cost effective, but flexible, sparing approach. The ECS Contractor will apply the sparing factors in determining spares to support the ECS A_O and MDT requirements stated in Table 5-1, ECS Release B Operational Requirements. The spares modeling results and the OEMs'/third party maintenance providers' spares complement recommendations will be reviewed to ensure adequate sparing. Any unacceptable sparing risks identified will be resolved through negotiation with the OEM/third party maintenance provider or separate sparing action by the ECS Contractor.

5.4 Sparing Methodology Exceptions

Release B sparing relies on OEM/third party maintenance providers, with exceptions for certain unique spares requirements. These exceptions recognize OEMs'/third party maintenance providers' reduced support capability at certain locations or for a particular product. The exceptions also recognize the importance of specific functions and equipment such as FOS, RAID, and communication devices along with the ECS Project's need to cost effectively meet operational and maintenance requirements. For these specific exceptions the ECS Project will provide certain spares over and above those provided by the maintenance providers. ECS Contractor sparing decisions will also be influenced by the timeliness of spares support available from OEM/Third party maintenance providers. An estimate of spares support timeliness at each location is contained in Appendix B, Projected OEM/Third Party Response Times. These response times are a combination of factual information, extrapolations, and best estimates.

The ECS Contractor will consider providing spares in the following instances and locations:

a. Insurance spares may be obtained for FOS hardware supporting critical real time operations. These spares will be stored on-site in order that either site personnel or the maintenance provider can perform replacement of the failed unit without encountering a delay in obtaining the replacement part. This will ensure quick restoration of the critical real-time fail-over capability , minimizing single-point-of failure exposure.

b. RAID and communications device hot-swappable components (i.e., disk drives, fan modules, controller cards, power supplies, etc.) may be obtained as spares to reduce the risk of an unacceptable data/communications loss. These spares will be stored on-site to allow expedited replacement of a failed RAID disk drive or power supply and communication device boards. These spares, especially in the SGI RAID units, will ensure quick restoration of the RAID units' ability to absorb a single disk drive or power supply failure without loss of data. The risk of two concurrent failures in a RAID unit is reduced by this sparing policy.

c. All hardware items at ASF and EDC will receive special sparing considerations due to their remoteness and transportation complications in the timely sparing or restockage from a rear echelon supply location. Because these sites are considered remote sites by OEMs/Third party maintenance providers, there may not be consistent responsive spares support within the DAACs' local area, impacting the ability to meet ECS A_O and MDT requirements. The ECS contractor will compare the OEMs'/third party maintenance providers' on-site/local area spares complement to the ECS spares modeling results to determine if an unacceptable spares risk exists. The modeling results will be extrapolated to include the site's remoteness considerations. Unacceptable sparing risks will be resolved through negotiation or separate sparing action by the ECS Contractor.

5.5 Preliminary Candidate Spares

Appendix A contains a list of Digital Equipment Corporation (DEC) hardware and LRUs that are part of the FOS critical real-time functions. The LRUs in Appendix A will be reviewed to determine which ones meet the requirement for insurance spares as defined in Paragraph 5.4. Those that qualify as insurance spares may be obtained for Release B on-site support. The hardware items' LRUs will be identified, analyzed and the sparing factors applied to determine qualification for insurance sparing decision by Release B RRR.

As the Release B detailed physical design is finalized and approved, the sparing analysis and application of sparing factors will continue to be reviewed. This review process will result in sound sparing recommendations to the ILS Management Team (ILSMT). Once approved by the ILSMT, a final spares list will be provided at Release B RRR.

Appendix A. Preliminary Spares Candidates

Table A-1. Preliminary Spares Candidates (1 of 3)

1	2	3	4	5	6a	6b	7a	7b	7c	7d	7e	7f	7g	7h	7i	8	9	10
							QUANTITY RECOMMENDED											
ITEM NO.	NATIONAL STOCK NUMBER	LRU DESCRIPTION	OEM'S or VENDOR'S PART or ORDER NUMBER	FMC	QTY USED PER ARTICLE	Tot Qty Installed	ASF	EDC	GSFC (DAAC)	GSFC (SMC)	GSFC (EOC)	GSFC (OEC)	JPL	LaRC	NSIDC	DEPOT	TOT QTY SPARED	UNIT COST
00000	NA	**Alpha 1000 4/266**	**CT-PB72S-FA**	TBD														
00001		Fan, 6.75 inch	12-36202-03	TBD	1	9					TBD						TBD	$82.00
00002		Assembly, PCB Video*	29-31717-01	TBD	1	9					TBD						TBD	$469.00
00003		PS/2 Compatible Mouse	30-34905-04	TBD	Varies	4					TBD						TBD	$19.00
00004		Enclosure/Power Supply Assenbly	30-41690-02	TBD	1	9					TBD						TBD	$165.00
00005		Alpha Server 1000 CPU 266M	54-23297	TBD	1	9					TBD						TBD	$4,920.00
00006		Mikasa System Board	54-23308-01	TBD	1	9					TBD						TBD	$1,301.00
00007		SCSI Terminator	12-41667-01	TBD	1	9					TBD						TBD	$12.00
00008		128MB Memory	PB7MA-AD	TBD	Varies	3					TBD						TBD	$8,653.40
00009		256MB RAM	PB7MA-AE	TBD	Varies	6					TBD						TBD	$17,521.35
00010		CD-ROM Drive*	PBXRD-CA	TBD	1	2					TBD						TBD	$239.58
00011		DAT Tape Drive, 8GB, 3.5"*	TLZ07-DA	TBD	Varies	8					TBD						TBD	$1,716.38
00012		4.3GB Internal Drive	RZ29B-EJ	TBD	Varies	15					TBD						TBD	$1,797.29
00013		Color Monitor- 21"*	VRC21-PA	TBD	Varies	4					TBD						TBD	$2,141.90
00014		Assembly, PCB Video*	29-31717-01	TBD	Varies	4					TBD						TBD	$469.00
00015		Assembly, PCB Control	29-31718-01	TBD	Varies	4					TBD						TBD	$367.00
00016		Assembly, PCB Power	29-131719-01	TBD	Varies	4					TBD						TBD	$408.00
00017		Assembly, PCB Power Switch	29-31721-01	TBD	Varies	4					TBD						TBD	$9.00
00018		CRT, Northern	29-31739-01	TBD	Varies	4					TBD						TBD	$2,109.00
00019		Assembly, PCB Deflect/CRT	29-32061-01	TBD	Varies	4					TBD						TBD	$720.00
00020		Assembly, PCB Deflect/Func	29-32062-01	TBD	Varies	4					TBD						TBD	$59.00
00021		Keyboard*	LK471-AA	TBD	Varies	4					TBD						TBD	$53.64
00022		Power Cord*	BN27S-03	TBD	1	9					TBD						TBD	$9.81
00023		Storage PCI Bus Adapter	KZPSA-BB	TBD	1	9					TBD						TBD	$1,630.56
00024		FDDI Controller/PCI (SC)	DEFPA-DA	TBD	Varies	4					TBD						TBD	$1,385.36

Table A-1. Preliminary Spares Candidates (2 of 3)

1	2	3	4	5	6a	6b	7a	7b	7c	7d	7e	7f	7g	7h	7i	8	9	10
							QUANTITY RECOMMENDED											
ITEM NO.	NATIONAL STOCK NUMBER	LRU DESCRIPTION	OEM'S or VENDOR'S PART or ORDER NUMBER	FMC	QTY USED PER ARTICLE	Tot Qty Installed	ASF	EDC	GSFC (DAAC)	GSFC (SMC)	GSFC (EOC)	GSFC (OEC)	JPL	LaRC	NSIDC	DEPOT	TOT QTY SPARED	UNIT COST
00025		FDDI Controller/EISA (MIC)	DEFEA-DA	TBD	Varies	4					TBD						TBD	$2,043.31
00026		PCI to SCSI Host Bus Adapter	KZPAA-AA	TBD	Varies	2					TBD						TBD	$290.15
00027	NA	**Alpha 200 4/100**	**PB410-DB**	TBD														
00028		400 Watt Power Supply	30-41976-01	TBD	1	2					TBD						TBD	$1,030.00
00029		CD-ROM Drive*	PBXRD-CA	TBD	1	2					TBD						TBD	$239.58
00030		Spare TZ26L-E*	4A-RRD45-AA	TBD	1	2					TBD						TBD	$808.00
00031		4MX36 DRAM Module, 70NS	54-21277-CA	TBD	1	2					TBD						TBD	$612.00
00032		Mustang Sound Board	54-23178-01	TBD	1	2					TBD						TBD	$200.00
00033		TGA 8 Plane	54-23184-01	TBD	1	2					TBD						TBD	$795.00
00034		Mustang Ethernet MAU	54-23252-01	TBD	1	2					TBD						TBD	$109.00
00035		Mustang System Module	54-23254-04	TBD	1	2					TBD						TBD	$1,832.00
00036		M3 Riser Board	54-24119-01	TBD	1	2					TBD						TBD	$170.00
00037		2.1GB Internal Disk Drive	PBXRZ-HB	TBD	1	2					TBD						TBD	$1,140.68
00038		64MB SIMMS Memory	MSPO1-AD	TBD	1	2					TBD						TBD	$2,857.05
00039		Keyboard*	LK471-AA	TBD	1	2					TBD						TBD	$53.64
00040		Color Monitor 21"*	VRC21-PA	TBD	1	2					TBD						TBD	$2,141.90
00041		DAT Tape Drive*	TLZ07-DA	TBD	1	2					TBD						TBD	$1,716.38
00042		SCSI Cable-3 meter	BC09D-03	TBD	1	2					TBD						TBD	$45.77
00043		**DECserver LAT Terminal Server**	**DSRVE-AA**	TBD														
00044		NJ8 to DB9 Adapter	**H8585-AA**	TBD	1	2					TBD						TBD	TBD
00045		**DEC 67" Cabinet**	**H9A10-CE**	TBD														
00046		DAT Tape Drive (Internal)	PBXTL-CA	TBD	Varies	6					TBD						TBD	$1,699.99
00047		8GB 4MM DAT Tape Drive	4A-TLZ07-BA	TBD	Varies	6					TBD						TBD	$1,747.00
00048		Tape Stacker	TLZ7L-VA	TBD	Varies	5					TBD						TBD	$3,391.07
00049		32GB 4MM Loader Spare	4A-TLZ7L-VA	TBD	Varies	5					TBD						TBD	$4,149.00

Table A-1. Preliminary Spares Candidates (3 of 3)

1	2	3	4	5	6a	6b	7a	7b	7c	7d	7e	7f	7g	7h	7i	8	9	10
							QUANTITY RECOMMENDED											
ITEM NO.	NATIONAL STOCK NUMBER	LRU DESCRIPTION	OEM'S or VENDOR'S PART or ORDER NUMBER	FMC	QTY USED PER ARTICLE	Tot Qty Installed	ASF	EDC	GSFC (DAAC)	GSFC (SMC)	GSFC (EOC)	GSFC (OEC)	JPL	LaRC	NSIDC	DEPOT	TOT QTY SPARED	UNIT COST
00050		SCSI Disks (RAID) 4.3GB	RZ29B-VA	TBD	Varies	27					TBD						TBD	$1,797.29
00051		StorageWorks Controller Shelf	BA35R-MR	TBD	Varies	2					TBD						TBD	$1,376.37
00052		Spare BA35X-HF	4A-BA35X-HF	TBD	Varies	2					TBD						TBD	$481.00
00053		SCSI Terminal Board Spare Kit	4A-BA35X-MB	TBD	Varies	4					TBD						TBD	$59.00
00054		SCSI Jumper Board Spare Kit	4A-BA35X-MC	TBD	Varies	4					TBD						TBD	$34.00
00055		Anti-static Port Work Station	29-26246-01	TBD	Varies	2					TBD						TBD	$52.00
00056		Fan Assembly (4 fan array)	H9COO-MH	TBD	1	4					TBD						TBD	$476.77
00057		StorageWorks Array Controller	KSZ40-BF	TBD	Varies	2					TBD						TBD	$9,644.40
00058		150W Universal AC Pwr Supply	BA35X-HF	TBD	Varies	8					TBD						TBD	$506.00
00059		SCSI-3 Cable (2 meter)	BN21K-02	TBD	Varies	2					TBD						TBD	$107.89
00060		SCSI-3 Cable (.5 meter)	BN21L-0B	TBD	Varies	1					TBD						TBD	$95.63
00061		SCSI-2 Cable (1 meter)	BN21H-01	TBD	Varies	3					TBD						TBD	$62.93
00062		SCSI-2 Cable (2 meter)	BN21H-02	TBD	Varies	4					TBD						TBD	$67.02
00063		SCSI"A" Cable (2 meter)	BN23G-02	TBD	Varies	4					TBD						TBD	$66.20
00064		68 Pin Connector (1 Male, 2 Female)	BN21W-0B	TBD	Varies	2					TBD						TBD	$121.78
00065		Cable - 7 meter	BN25G-07	TBD	Varies	4					TBD						TBD	$6.95
00066		SCSI-2 Cable - 1.5 meter	BN31L-1E	TBD	Varies	2					TBD						TBD	$73.56
00067		Power Cord - 3 meter*	BN27S-03	TBD	Varies	5					TBD						TBD	$9.81
00068																		

*** = Part is listed in more than one application**

Repair Code: 1 = disposable item. 4 = Return to OEM for repair

Appendix B. Projected OEM/Third Party Response Times

Table B-1. Projected OEM/Third Party Response Times (1 of 2)

Rel B sites	OEM or vendor #1	OEM or vendor #2	OEM or vendor #3	OEM or vendor #4	OEM or vendor #5	OEM or vendor #6
GSFC technician spare in area Out of area	10m auto 25% 10m auto 99% 20m auto	30m auto unk % 30m auto 99% FEDEX/CC fm Chicago or Denver	30m auto 75% 30m auto 99% FEDEX fm California	30m auto 90% 30m auto 99% 2hr courier or FEDEX/CC fm Mass	15-30m auto 75% 15-30m auto 99% FEDEX fm Mass or Tx	45m auto 60% 45m auto 99% FEDEX/CC
LaRC technician spare in area Out of area	30m auto 75% 2m walk 99% 50m auto	4hr auto unk % 4hr auto 99% FEDEX/CC fm Chicago or Denver	15m auto 75% 15m auto 99% FEDEX fm California	20m auto 90% 2hr courier 99% 2hr courier or FEDEX/CC fm Mass	45m auto 50% 45m auto 99% FEDEX fm Texas	35m auto 90% 35m auto 99% 2-4 hrs auto
EDC technician spare in area Out of area	10m auto 90% 10m auto 99% 5hr auto	unk unk 99% FEDEX/CC fm Chicago or Denver	next day flying 95% FEDEX/CC fm Minneapolis 99% FEDEX/CC fm California	15m auto 90% 15m auto 99% 2hr courier or FEDEX/CC fm Mass or Ca	10m auto 50% 10m auto 99% FEDEX fm Mass	1-12 hrs auto 70% 30m auto 99% FEDEX/CC
NSIDC technician spare in area Out of area	10m auto 99% 30m auto 99% 20m auto	60m auto 99% 60m auto 99% 60m auto fm Denver Depot	40m auto 80% 40m auto 99% FEDEX/CC fm California	45m auto 90% 45m auto 99% 2hr courier or FEDEX/CC fm California	50m auto 50% 50m auto 99% FEDEX fm Texas	60m auto 90% 60m auto 99% FEDEX/CC fm California
ASF technician spare in area Out of area	15m auto 50% 1m walk 99% 15m auto	unk unk 99% FEDEX/CC fm Chicago or Denver	2+ hrs or next day flying 90% FEDEX/CC fm Seattle 99% FEDEX/CC fm California (This will improve)	2+ hrs or next day flying 90% FEDEX/CC fm Anchorage 99% FEDEX/CC fm California	2+ hrs or next day lying 65% FEDEX/CC fm Anchorage 99% FEDEX fm Mass	2+ hrs or next day flying unk% FEDEX/CC fm Anchorage 99% FEDEX/CC fm Seattle

Table B-1. Projected OEM/Third Party Response Times (2 of 2)

Rel B sites	OEM or vendor #1	OEM or vendor #2	OEM or vendor #3	OEM or vendor #4	OEM or vendor #5	OEM or vendor #6
JPL technician spare in area Out of area	60m auto 25% 10m walk 99% 3hr auto	unk unk % 60m auto 99% FEDEX/CC fm Chicago or Denver	30m auto 85% 30m auto 99% 3hrCC in California	50m auto 90% 50m auto 99% 2hr courier or FEDEX/CC fm California	30m auto 50% 30m auto 99% FEDEX fm Texas	unk unk unk
ORNL technician spare in area Out of area	20m auto 75% 1m walk 99% FEDEX fm Atlanta	unk unk 99% FEDEX/CC fm Chicago or Denver	1-24 hrs auto 80% 1 hr auto 99% FEDEX/CC fm California	60m auto 90% 2hr courier 99% 2hr courier or FEDEX/CC fm Mass	75m auto 50% 75m auto 99% FEDEX fm Texas	unk unk unk

CC = counter to counter airline delivery of spare, on first available flight.
M = minute(s)
hr = hour(s)
fm = from
in area = on-site or local area adjacent to the site
out of area = rear echelon or central sparing

Information relating to the OEM/Third party response time is an estimate based on past experience, information from site personnel, casual conversations with some OEM personnel, and OEM information from some OEMs that was provided as a “best guess estimate”.

OEM and Maintenance Vendors referred to in each column are known, but not specifically identified due to the incompleteness of definitive information. As better information is obtained, this table will be updated. When the information is sufficiently definitive, OEMs/vendors names will be entered in the column headings.

Abbreviations and Acronyms

Ao	Operational Availability
ALDT	Administrative/Logistics Delay Time
CDRD	Contract Data Requirement Document
CDRL	Contract Data Requirements List
COTS	Commercial Off-the-Shelf
CSMS	Communications and Systems Management Segment
DAACs	Distributed Active Archive Centers
DID	Data Item Description
ECS	EOSDIS Core System
EDC	Earth Resources Observation Systems (EROS) Data Center
EDF	ECS Development Facility
EOSDIS	Earth Observing System (EOS) Data and Information System (DIS)
EROS	Earth Resources Observation Systems
F&PRS	Functional and Performance Specifications
FOS	Flight Operations Segment
GSFC	Goddard Space Flight Center
HDBK	Handbook
HW	Hardware
ILS	Integrated Logistics Support
ILSMT	ILS Management Team
ILSO	Integrated Logistics Support Office
ILSPM	ILS Program Manager
LaRC	Langley Research Center
LCC	Life Cycle Cost
LRU	Line Replaceable Unit
M&O	Maintenance and Operations

MDT	Mean Down Time
MIL	Military
MSFC	Marshall Space Flight Center
MTBF	Mean Time Between Failure
NASA	National Aeronautics and Space Administration
NHB	NASA Handbook
OEM	Original Equipment Manufacturer
PAIP	Performance Assurance Implementation Plan
RMA	Reliability, Maintainability, and Availability
RRR	Readiness Release Review
SCDO	Science and Communications Development Organization
SEO	Sustaining Engineering Organization
SMC	System Monitoring and Coordination Center
SMO	System Management Office
SW	Software